

CLAIMS

WHAT IS CLAIMED:

1. A method of multipath searching using a signal transmitted by a source and received by a plurality of antennae, comprising:

5 subjecting at least one control bit in at least one received signal to temporal processing;
 subjecting the at least one control bit in the received signal to spatial processing; and
 determining a time delay and a direction associated with the source based upon the
temporal processing and the spatial processing.

10 2. The method of claim 1, wherein subjecting each of the control bits to temporal processing
comprises subjecting each of the control bits to temporal processing substantially before
subjecting each of the control bits to spatial processing.

15 3. The method of claim 1, wherein subjecting each of the control bits to spatial processing
comprises subjecting each of the control bits to spatial processing substantially before subjecting
each of the control bits to temporal processing.

20 4. The method of claim 1, wherein subjecting the at least one control bit in the received
signal to temporal processing comprises subjecting at least one of a pilot control bit, a feedback
information bit, a transport format combination indicator bit, and a transmit power control bit in
at least one received uplink dedicated physical control channel to temporal processing.

5. The method of claim 1, wherein subjecting the at least one control bit in the received
signal to spatial processing comprises subjecting at least one of a pilot control bit, a feedback

information bit, a transport format combination indicator bit, and a transmit power control bit in at least one uplink dedicated physical control channel to spatial processing.

6. The method of claim 1, wherein determining the time delay and the direction associated with the source comprises determining whether a received signal includes only noise or the received signal includes noise and the received uplink signal.

7. The method of claim 6, wherein determining the time delay and the direction associated with the received signal comprises:

forming at least one decision statistic based upon the temporal processing and the spatial processing; and

comparing the at least one decision statistic with at least one corresponding threshold.

8. The method of claim 7, wherein forming the at least one decision statistic comprises forming a plurality of partial correlations by coherently accumulating at least one control bit block corresponding to the at least one control bit in the received signal.

9. The method of claim 8, wherein forming the at least one decision statistic comprises non-coherently summing the plurality of partial correlations.

10. The method of claim 1, wherein subjecting the at least one control bit in the received signal to spatial processing comprises applying an angular weight vector to the received signal.

11. The method of claim 10, wherein applying the angular weight vector to the received signal comprises applying the angular weight vector to the received signal at a chip or a sub-chip rate.

5 12. The method of claim 10, wherein applying the angular weight vector to the received signal comprises applying the angular weight vector to the received signal using a Fast Fourier Transform.

10 13. The method of claim 1, wherein subjecting the at least one control bit in the received signal to temporal processing comprises temporally correlating at least one control bit block associated with the at least one control bit in the received signal.

15 14. The method of claim 13, wherein subjecting the at least one control bit in the received signal to temporal processing comprises performing a post-detection integration by non-coherently summing at least one signal representative of the at least one control bit block.

15. The method of claim 1, wherein determining the direction associated with the source comprises determining an angle-of-arrival associated with the source.

20 16. A method, comprising:

forming a first signal by spatially processing at least one control bit in at least one received signal based upon at least one angle;

forming a second signal by temporally processing the first signal; and

25 determining a time delay and a direction associated with the source based upon the second signal.

17. The method of claim 16, wherein forming the first signal by spatially processing the at least one control bit in the received signal based upon the at least one angle comprises applying at least one angular weight vector associated with the at least one angle to the received signal.

18. The method of claim 17, wherein forming the first signal by spatially processing the at least one control bit in the received uplink signal comprises applying a fast Fourier transform to the at least one angle-weighted received signal.

19. The method of claim 16, wherein forming the second signal by temporally processing the first signal comprises:

temporally correlating at least one control bit block associated with the at least one control bit in the received uplink signal to form a third signal; and

forming the second signal by a post-detection integration using the third signal.

20. The method of claim 19, wherein temporally correlating the at least one control bit block associated with the at least one control bit in the received uplink signal comprises temporally correlating the at least one control bit block associated with the at least one control bit in the received uplink signal using at least one channel code.

21. The method of claim 16, wherein determining the time delay and the direction associated with the source based upon the second signal comprises:

forming at least one decision statistic using the second signal; and

comparing the at least one decision statistic with at least one corresponding threshold.

22. A method of multipath searching using a signal transmitted by a source and received by a plurality of antennae, comprising:

forming at least one first signal by temporally correlating at least one control bit in at least one received uplink signal;

5 forming a second signal by spatially processing the at least one first signal based upon at least one angle; and

determining a time delay and a direction associated with the source based upon the second signal.

10 23. The method of claim 22, wherein forming the first signal by temporally correlating at least one control bit in the received uplink signal comprises forming the first signal by temporally correlating at least one control bit in the received signal using at least one channel code.

15 24. The method of claim 22, wherein forming the second signal by spatially processing the first signal based upon the at least one angle comprises forming at least one angle-weighted signal by applying at least one angular weight vector associated with the at least one angle to the at least one first signal.

20 25. The method of claim 24, wherein forming the second signal comprises summing the angle-weighted signals.

26. The method of claim 24, wherein forming the second signal comprises applying a fast Fourier transform to the at least one angle-weighted signal.

27. The method of claim 22, wherein determining the time delay and the direction associated with the source based upon the second signal comprises:

forming a third signal by a post-detection integration using the second signal;

forming at least one decision statistic using the third signal; and

5 comparing the at least one decision statistic with at least one corresponding threshold.

28. A method, comprising:

providing a first signal having at least one control bit such that a time delay and a direction associated with the first signal is determinable based upon temporally processing and
10 spatially processing the received first signal.

29. The method of claim 28, wherein providing the first signal having the at least one control bit comprises providing the first signal having at least one a pilot control bit, a feedback information bit, a transport format combination indicator bit, and a transmit power control bit in
15 at least one received uplink dedicated physical control channel.

30. The method of claim 28, wherein providing the first signal comprised providing the first signal having an associated time-delay and an associated direction.

20 31. The method of claim 30, wherein providing the first signal having the associated time direction comprises providing the first signal having a plurality of angles-of-arrival at the plurality of antennae.